

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
24 March 2005 (24.03.2005)

PCT

(10) International Publication Number  
**WO 2005/027053 A1**

(51) International Patent Classification<sup>7</sup>: **G06T 17/20**

MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:  
PCT/EP2004/052154

(22) International Filing Date:  
13 September 2004 (13.09.2004)

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
MI2003A 001779  
18 September 2003 (18.09.2003) IT

**Declarations under Rule 4.17:**

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- of inventorship (Rule 4.17(iv)) for US only

(71) Applicant (for all designated States except US): **PO-LITECNICO DI MILANO** [IT/IT]; Piazza Leonardo da Vinci, 32, I-20133 Milano (IT).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TUBARO, Stefano** [IT/IT]; Via Prella, 21, I-28100 Novara (IT). **SARTI, Augusto** [IT/IT]; Via Solferino, 125, I-20038 Seregno (IT). **PICCARRETA, Luca** [IT/IT]; Via Millelire, 18, I-20147 Milano (IT). **MARCON, Marco** [IT/IT]; Via Cinque Giornate, 21, I-20021 Bollate (IT).

(74) Agent: **MITTLER, Enrico**; Mittler & C. s.r.l., Viale Lombardia, 20, I-20131 Milano (IT).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **METHOD FOR DETERMINING THE THREE-DIMENSIONAL SURFACE OF AN OBJECT**

(57) Abstract: The present invention refers to a method for determining the threedimensional surface of an object. In an embodiment thereof the method for determining the three-dimensional surface of an object comprises the phases of: defining (1) the coordinates of a plurality of points of said object; defining (2) a three-dimensional matrix of cells that contains said object to which a value can be associated; determining (3) the distance between each centre of said cells of said three-dimensional matrix of cells and the closest point of said plurality of points of said object; setting (4) the value of several cells of said three-dimensional matrix of cells at a first preset value; determining (7) the value that each cell of said three-dimensional matrix of cells assumes, with the exception of said several cells, by means of the following formula (I). Where formula (Ia) represents the coordinates of the centre of the  $i$ -th cell, formula (Ib) represents the value of the  $i$ -th cell at time  $t$ ,  $v_i$  represents said distance,  $w$  represents a second preset value, and  $j$  indicates a neighbourhood of cells of the  $i$ -th cell; determining (9) the sum in module of the variations of the value of each cell between the time  $t$  and the time  $t+1$ ; repeating (10) said phase of determining the value that each cell of said three-dimensional matrix of cells assumes if said sum is greater than a third preset value.



WO 2005/027053 A1